

with camera 34 on, the timer 112 can send a signal S4 to turn camera 34 off. Thus the camera circuit 38 has a dual sleep mode where the camera 34 and nearly all circuitry in circuit 38 except timer 110 sleeps until a signal S1 is received.

[0018] The circuit 38 can include an alternate sensor 150 that might close switch 120 based on receiving a local signal such as movement or sound in the remotely monitored location. Thus movement of an animal, or an elderly parent calling for help could close switch 120 and power up receiver decoder 122. Alternately, for some applications, the motion detector 150 would apply a signal to the receiver decoder 122 that could only be detected when the timer 110 has the receiver detector 122 awake.

[0019] The camera power 132 comes from a step up voltage booster 131. The voltage booster 131 can boost the voltage of a battery up to meet a minimum threshold required by the camera 34. For example, if the battery 100 is going dead and its voltage has dropped below the minimum, the voltage booster will increase the battery voltage so that more power can be drained from the battery 100 to extend the camera 34 operating time. So if for example, the battery 100 was a 9 volt battery to power a camera that needed roughly 8 volts, experience has shown that when the batteries dropped to 7 volts the camera 34 would stop working wasting the remaining power.

[0020] The battery 100 currently used is three 1.5 volt AA batteries that are hooked in series to give 4.5 volts. The receiver 122 and timers 110 and 112 can operate directly on battery voltage. The camera 34 runs on approximately 8 volts, so to operate on the three AA battery 100 the voltage must be boosted.

[0021] In the preferred embodiment, battery power 100 is wired in parallel with solar cell 102. Battery 100 is preferred to be 3 rechargeable AA batteries but other voltages and types of batteries may be used. The preferred analog video camera 34 is miniature, a low power, black and white, CMOS unit as is known in the art. Color CMOS units may also be used. The preferred analog video camera 34 operates on a standard transmission frequency of approximately 2.4 GHz, with a voltage range of 6 to 12 volts at a power output of 50 to 200 mw. The preferred analog video camera 34 can operate at a minimum illumination of 3 LUX.

[0022] Analog video camera 34 can be wired in series with the light source 32. Light source 32 can be an LED light in the preferred embodiment but can also be made from halogen, incandescent or other types of light sources. The light 32 may not be required for some applications.

FIG. 3

[0023] FIG. 3 shows the flow chart 300 for checking for activation signal S1 and for turning the circuit 122 and camera system 30 on and off. The timer circuit 110 is turned on 302 and monitored 304 by switch 120. So long as the timer 110 is off no power 306 is applied to receiver decoder circuit 122. When the timer circuit 110 reaches a preset time, then power is applied to receiver decoder circuit 122 to listen 308 for signal S1.

[0024] If the signal S1 is present 310, then the timer 112 is started 312 and power is applied 314 to the camera system 30 for the amount of time preset in timer 112. When the timer 112 expires 316, power is turned off 318 from remote camera system 30.

FIG. 4

[0025] FIG. 4 shows a timeline comparing the duration of the timer 110 to the duration of the activation signal S1. The

top line T1 shows that the timer 110 periodically activates the receiver circuit 122. The period when the receiver decoder circuit 122 is turned off is T1. The lower line shows an activation signal S1 that occurs at some time. The duration of the activation signal is T2 which is longer than the period T1 such that the activation signal S1 will be received no matter when it is sent because it will overlap at least one waking period for the receiving decoder circuit 122. This conserves battery power at the remote site. The period T2 may be longer than the user holds button 22, the period T2 can be created by mechanical or electronic means from a instant push of the button 22.

Operation of Preferred Embodiment

[0026] The remote viewing system is normally in sleep mode. Remote RF receiver/decoder 38 in FIG. 2 is normally in standby/low power consumption mode waiting for a RF activation signal S1 to activate the camera 34. The user can turn the power on for monitor 50 and receiver for analog transmission 40 or in some cases these may be left on at all times and may be capable of recording a video transmission. The user activates power button 22 on transmitter 20. Transmitter 20 then sends a radio frequency signal S1 to instantaneous remote camera system 30 as shown in FIG. 1. Instantaneous remote camera system 30 goes from low power-sleep mode to transmit power-on mode and transmits an instantaneous analog image to RF receiver 40 as shown in FIG. 1. RF receiver 40 sends the visual and sound signal to television or other monitor 50 for viewing by the user. When the user releases power button 22, the RF transmission stops when timer 112 times out and remote camera system 30 goes from transmit power-on mode to low power, sleep mode and the image stops. Thus a user could push and release button 22 to receive a brief view the length of which would be set by the time set for timer 112. This would give the user a brief energy conserving look, the user could extend the video transmission S2 by holding the button 22 down.

[0027] FIG. 2 shows the details of the components of the remote camera circuit 38. Remote camera circuit 38 is normally in low power consumption-sleep mode and the only component activated is timer 110. When timer 110 activates receiver decoder circuit 122 it checks for a signal S1 for a length of time set on timer 110 which could be less than one second and then allows the receiver circuit 122 to sleep for a duration of time that can be seconds or minutes to save battery power. For example, the transmitter 20 can be set to send an activation signal S1 that lasts for 30 seconds. The timer 110 can activate the receiver decoder once every 25 seconds, that is to say the duration of the sleep cycle is less than the duration of one activation signal. This creates an overlap where at least a portion of any 30 second activation signal S1 must fall within one or more of the times when the receiver decoder circuit 122 is on to receive it.

[0028] Although the description above contains many specific details, these should not be construed as limiting the scope of the invention but as merely providing illustrations of some of the presently preferred embodiments of the invention.

[0029] Many different battery power sources can be used such as alkaline, nickel cadmium, lithium ion and others. The term battery is meant to include all battery systems known in the state of the art. Similarly there are many different types of receivers/controllers, transmitters and receivers with video transmission capabilities that are known in the state of the art